



Focus

Major Air Pollutants

Ozone

Background

Ozone at ground level is different from the “good” ozone in the upper atmosphere that protects us from the sun’s harmful rays. At ground level, ozone is a key component of smog and can pose risks to human, animal, and plant life. Ground level ozone comes from the interaction of ultraviolet rays from sunlight with emissions from motor vehicles, industry, solvents, and gasoline fumes. It is formed on warm, sunny days when gases or vapors of chemicals called volatile organic compounds mix in the air with nitrogen oxides. Most ozone pollution occurs in late spring, summer and early fall, when the days are longer and there is enough sunlight to heat the chemicals.

Most of the air pollutants that form ozone come from many small sources spread over a wide area. Nearly two-thirds of these emissions are from motor vehicles. Vehicle use is growing faster than population in Washington as land use, development, and transportation patterns have fostered continued reliance on cars for basic transportation.

Industry is a smaller contributor to the ozone problem, but is still a significant source. The commercial, industrial, and residential use of solvents adds to ozone pollution as well. Dry cleaners, gas stations, auto body paint shops, cleaning of mechanical and electronic parts, outdoor burning, and house painting are examples of activities that commonly generate pollutants that form ozone.

Western Washington’s ozone problem

The federal Environmental Protection Agency (EPA) declares areas “nonattainment” when levels of certain air pollutants do not meet federal health-based standards. Western Washington areas that were previously nonattainment for ozone are now “maintenance” areas, which means they are meeting the ozone standard and have a plan to continue maintaining air quality. However, ozone remains a concern due to population growth and increased motor vehicle use.

Health effects of ozone

Ozone can pose serious health problems. It can irritate and inflame the breathing passages in the lungs, throat, nose, and sinuses. It can reduce resistance to infections, colds, and other diseases. It can cause harmful changes in breathing passages, reduce the lung’s working ability, and worsen existing conditions such as asthma, bronchitis, and emphysema. Ozone can cause coughing, wheezing, chest tightness, dry throat, headaches, and nausea. People exposed to ozone can experience fatigue, shortness of breath, or pain during deep breaths. Those at greatest risk are those who exercise heavily during periods of peak ozone concentrations, children, the elderly, and those with existing lung or immune system problems.

Ozone's wide-ranging effects

Breezes often blow pollution from urban areas toward rural areas and the mountains. By the time this "urban air" arrives, ozone has often reached its highest concentrations. In fact, the Department of Ecology's ozone monitoring program has recorded its highest readings in the Cascade foothills. Because of the way ozone moves through the air, people downwind from urban areas during clear weather can be exposed to unhealthful concentrations of ozone.

Ozone can also harm vegetation. The downwind areas that experience high ozone concentrations include some of western Washington's agricultural areas. The U.S. Forest Service and the National Park Service report that ozone has damaged trees, moss, and lichens in Mt. Rainier National Park and in Cascade forests and wilderness areas.

Damage to materials attributed to ozone includes cracking of rubber products, weakening of textiles, changes in dyes, and premature cracking of paint.

Controlling ozone

The Washington Clean Air Act adopted in 1991 required the Department of Ecology to decrease the amount of ozone in the air around us through motor vehicle emission checks, reduction of traffic and the use of single-occupancy vehicles, research into and use of alternative fuels and a permit program for industrial facilities.

In addition to these activities, Ecology and local air pollution control agencies have been pursuing strategies to control nitrogen oxides and volatile organic compounds, the main ingredients of ozone. These strategies include gasoline vapor controls, regulation of volatile organic compounds and toxic chemicals, and review of permit applications of potential major air pollution sources.

A new ozone standard

EPA sets health-based standards for six major air pollutants, including ozone. The standard for ozone limited ozone levels to 0.12 parts per million averaged over a one-hour time period. In response to research that found levels of ozone below this standard can be harmful to human health, EPA recently revised the ozone standard to better protect public health. Under the new standard, ozone levels must be no higher than 0.08 parts per million averaged over an eight-hour time period. Judging from current and previous ozone data, Ecology expects all areas of Washington to meet the new ozone standard, although the central Puget Sound and Portland-Vancouver areas may meet it by only a small margin. Population growth and increased motor vehicle use will continue to make meeting the standard a challenge in these areas.

For more information

Focus sheets on other major pollutants, as well as on air quality programs, are available from the Washington State Department of Ecology, P.O. Box 47600, Olympia, WA 98504-7600; or by calling:

Tami Dahlgren
Department of Ecology

(360) 407-6830

If you have special accommodation needs or require this document in alternative format, please call Tami Dahlgren at (360) 407-6830 (voice); or (360) 407-6006 (TDD only).